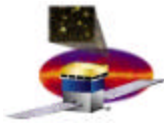


BACK-UP Slides

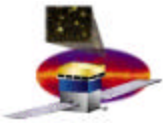




Fabrication / Quality Control

- Piece part inspection of hardware at time of receipt
- Operators qualified / certified
 - Soldering
 - Surface Mount Technology
 - Crimping, Cable, Harness, and Wiring
 - Fiber Optics
 - Staking, Potting, Conformal Coating
 - ESD
- Processes defined and documented (including non-standard processes)
 - Non-standard processes shall include special inspection instructions and techniques
 - Qualification or demonstration shall be addressed for each special process
- Inspections inserted at the correct fabrication points

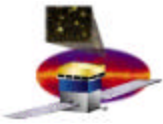




Inspection Points

- **Incoming Piece Part (Electrical / Mechanical)**
 - Review procurement document for proper requirements
 - Is source inspection required / necessary
 - Verify pure tin is not being used
 - Are the correct requirements imposed
 - Perform receiving inspection
 - Verify data per procurement call outs and receiving plan
 - Perform test data review
 - Perform piece part inspection (per plan or mfg. requirements)
 - Test, if required
 - Visual (4X — 10X) / Typical
 - Is additional testing or screening required
 - Bag and tag hardware (flight)

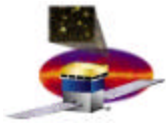




Inspection Points

- **CCA Inspection**
 - PWB coupon analysis performed
 - GSFC or approved lab
 - Kit Pull Verification / Inspection (items required for flight assembly)
 - Traceability
 - Damage
 - Assembly Inspection (In-process)
 - PWB pre-baked
 - Verify that any inspections that are inaccessible later, are performed real time
 - Post Solder (100% inspection)
 - Verify as built vs. as design
 - Post open-frame, card test handling damage and data review

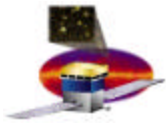




Inspection Points

- **CCA Inspection cont'd**
 - **Pre conformal coating / staking**
 - **Post conformal coating**
 - **Verify Witness Sample (cure /shore hardness)**
 - **Control Specimen (coated concurrently with regular operation)**
 - **UV (Black Light) Inspection**
 - **4X-10X Inspection Performed**
- **Harness Fabrication Inspection**
 - **Kit Pull Verification / Inspection (items required for flight assembly)**
 - **Traceability**
 - **Damage**

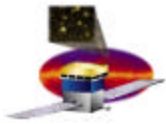




Inspection Points

- **Harness Fabrication Inspection cont'd**
 - **Assembly inspection (in-process)**
 - **Crimp inspections (100 %)**
 - **Crimp pull test (am / pm)**
 - **Solder inspection (100 %)**
 - **Solder Cups**
 - **Solder Shields**
 - **Raychem' s (Solder Sleeves)**
 - **Shrink tubing**
 - **Stress relief, cable ties, routing**
 - **Potting (includes shore hardness check)**
 - **Witness Sample (cure/shore hardness)**
 - **As built vs. as design**
 - **Marking / Identification**

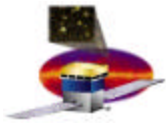




Inspection Points

- **Harness Fabrication Inspection cont'd**
 - **Test**
 - Continuity
 - IR / Hypot (Insulation Resistance/Dielectric Withstanding Voltage), Reference NASA-STD-8739.4
 - Special test considerations
- **Component / Subsystem / Inspections**
 - **Kit Pull Verification / Inspection (items required for flight assembly)**
 - Traceability
 - Damage

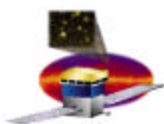




Inspection Points

- **Component / Subsystem / Inspections cont'd**
 - **Witness Assembly**
 - Follow print
 - Verify torque
 - Verify locking applications (Uralane, etc.)
 - As built vs. as design
 - Markings per print
 - Photographs of the individual CCAs (front and back) and closure
 - **Pre Test Review**
 - Manufacture Test and Inspection Logs (lower level)
 - Open Items
 - Anomaly Reports and disposition
 - Identify all Constraints

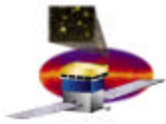




Inspection Points

- **Component / Subsystem / Inspections cont'd**
 - **Test inspection (in-process)**
 - **Verify procedure approved for use**
 - **Verify Ground Support Equipment (GSE) is acceptable for flight use**
 - **When interfacing with flight hardware, interfaces shall be of flight quality**
 - **Calibration of all support equipment current and will not expire prior to test completion**
 - **Connector savers being utilized**
 - **Procedures should detail when and when not acceptable for use**
 - **Witness set-ups and critical test**
 - **Perform data reviews throughout acceptance test program**
 - **Perform inspections pre/post environments and moves**
 - **Perform final acceptance test data review / inspection**

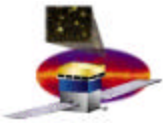




Typical Source Inspections

- Precap visuals when deemed necessary
- Post solder / pre conformal coating
- Pre closure when deemed necessary
- Post test acceptance data review / pre-ship inspection

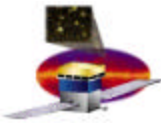




Test Program

- Accumulate significant mission specific test time
 - Thermal Environments
 - Failure free hours of operation
 - Minimum hours of operation
- Verify as built hardware meets designer's requirements in the intended application
- Allow sufficient test time to find infant mortality failures
 - Unpowered thermal cycles at lower levels (assembly level)
- Trend data
- Review test data prior to changing configurations / set-ups
- Verify electrical / software functions perform in conjunction with each other





Test Program

- Environmental test performed in accordance with GEVS and mission specific requirements:
 - Vibration
 - EMI/EMC
 - Thermal Vacuum
 - Thermal Balance
 - Bake Out
 - Special Test
- End-to-End testing
- Failure-free hours of operation achieved (including thermal)
- Failures are properly identified and fully disposition prior to proceeding to breaking/changing configuration or proceeding to the next level
- Verification / Validation Plan and Matrix
 - Full data review at completion of test program by review team
 - Will complete subsystem Certificate of Acceptance Form

